Advanced Identification (ADID) Techniques Used to Protect Wetlands and Aquatic Resources in a Rapidly Growing County

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Abstract

McHenry County, Illinois, approximately 40 miles northwest of Chicago, is one of the fastest growing counties in the state. It also is home to many valued wetland and stream communities that are threatened by the impacts of new development. Because of this, county government officials, with funding from the U.S. Environmental Protection Agency, sought the assistance of resource experts from various local, regional, state, and federal agencies. Their task was to assess the quality of the aquatic resource and to develop strategies for improved wetland protection. The project initially involved the development of an up-to-date countywide inventory of wetlands, lakes, and streams. This inventory showed that over 11% of the county was covered with wetlands and waterbodies. These aquatic resources then were evaluated and rated based on the habitat, water quality, and stormwater storage functions that they provided. While only a small fraction of the total number of wetlands -- about 11% -- of the county's wetlands were designated high quality, these wetlands represented over 60% of the total wetland acreage. Inventory and assessment data were transferred to a customized CD-ROM mapping tool to provide ready access to project information by resource managers, planners, and local governments. The project team also developed a protection strategy for aquatic resources that was tied to the results of the Advanced Identification (ADID) study. In particular, it identified four critical protection components: improved education, regulations and best management practices, acquisition, and restoration. Though the ADID study is only recently completed, there are strong indications that this protection strategy is being taken seriously by officials in the county.

Background

McHenry County, Illinois lies approximately 40 miles northwest of Chicago along the Wisconsin border. Reflecting a history of glacial activity, McHenry County possesses an abundance of wetland types in a variety of physical settings. Predominant wetland types include palustrine, lacustrine, and riverine systems. Palustrine wetlands are found in a wide variety of geographic settingsand terrains in the county and include marshes, bogs, fens, wet prairies, forested wetlands, and ponds. Lacustrine wetlands are less common. They are found mostly in eastern portions of the county and are exemplified by the wetlands of the Fox River - Chain 0' Lakes. High quality rivers and streams, and associated riverine wetlands, are relatively common. In fact, McHenry County has some of the highest-quality stream ecosystems in Illinois, as exemplified by the Kishwaukee River and its tributaries.

While predominantly rural, McHenry County is one of the fastest urbanizing counties in the state. From 1990 to 1998, its population grew by 31.5% to 240,945. Population is forecast to grow to nearly 362,000 by 2020, an increase of an additional 50%. This rapid population growth has raised concerns over possible adverse impacts on the county's wetlands, lakes, and streams.

Historically, wetland and stream protection measures in McHenry County have included federal regulations, local government ordinances, and acquisitions by government agencies, primarily the McHenry County Conservation District and the Illinois Department of Natural Resources. However, with the recent rapid pace of urban development, unacceptable loss and/or degradation of wetlands and aquatic resources have been observed. Concerned over the possible environmental effects of rapid growth, the county board invited the U.S. Environmental Protection Agency Region 5 (EPA) to perform an "advanced identification" (ADID) study of its wetlands and aquatic resources.

An ADID project can have several objectives. One objective is to shorten permit processing, while providing increased predictability to the Corps of Engineers regulations under Section 404 of the Clean Water Act. ADID also provides information that can be used by state and local governments to aid in zoning, permitting, or land acquisition decisions. Another objective of ADID is to provide information to agencies, landowners, and private citizens interested in restoration or acquisition of aquatic sites.

Approach

The ADID study was initiated in 1995, under the coordination of the Northeastern Illinois Planning Commission (NIPC). The study was a cooperative effort among federal, state, and local agencies to inventory, evaluate, and map high-quality wetland and aquatic resources in the county. From the federal perspective, the primary purpose of this ADID study was to designate wetlands or other waters of the United States that are unsuitable for discharge of dredged or fill material. From the local perspective, the purposes of ADID were to improve the overall protection mechanism for wetlands via improved local regulation, improved predictability in the permitting process, identification of potential mitigation/restoration sites, and identification of potential sites for acquisition.

The scope of work for the ADID project included the following tasks:

- form a Technical Advisory Committee and a Planning and Policy Committee;
- develop ADID objectives for McHenry County and a strategy for protection and management;
- identify and map existing wetlands and aquatic resources;
- develop an evaluation methodology for identified functions of wetlands and aquatic resources;
- apply evaluation methodology utilizing Geographic Information System (GIS) technology and field inspection;
- map ADID sites for public review;
- develop a CD-ROM tool that contains both the project data and a customized GIS interface for display, query, and mapping; and
- produce a final report and brochure and conduct a workshop for local governments, landowners, and consultants.

The Technical Advisory Committee and the Planning and Policy Committee were formed soon after initiation of the project. There were two general purposes for these committees: 1) provide technical and policy assistance to NIPC and EPA, and 2) provide a forum for educating local interest groups regarding the value of wetlands and aquatic resources in the county.

The principal role of the Technical Advisory Committee was to advise project staff on scientific issues, particularly the development of evaluation methodologies for wetlands, lakes, and streams. Technical committee members provided expertise in wetland biology, soil science, hydrology, engineering, water quality, and computerized mapping. Technical committee members contributed substantial time evaluating wetlands, both in the office and the field. The technical committee consisted of the following invited agencies and organizations:

- U.S. Environmental Protection Agency, Region 5
- U.S. Army Corps of Engineers, Chicago District
- U.S. Department of the Interior, Fish and Wildlife Service, Chicago-Metro Wetlands Office
- USDA, Natural Resources Conservation Service
- Illinois Department of Natural Resources

. McHenry County Department of Planning and Development

. McHenry County Conservation District

. McHenry County Soil and Water Conservation District

. Fox Waterway Agency

. Northeastern Illinois Planning Commission

The principal role of the Planning and Policy Committee was to advise project staff on policy, particularly the determination of wetland functions important to McHenry County. The policy committee also provided advice on the development of a wetland protection and management strategy. The policy committee included all of the members of the technical committee as well as members of the following organizations:

. Homebuilders Association of Greater Chicago

. Illinois Audubon Society, McHenry County Chapter

. Illinois Environmental Protection Agency

• Land Foundation of McHenry County

. McHenry County Board

. McHenry County Defenders (a local environmental group)

. McHenry County Farm Bureau

. McHenry County Municipal Association

• McHenry County Realtors Association

• McHenry County Stormwater Committee

• Openlands Project (a regional open space advocate)

Developing an Aquatic Resource Inventory

Detailed inventories of wetlands, lakes, and streams were developed early in the project. Two principal existing inventories were considered for identifying and mapping wetlands: the National Wetland Inventory (NWI) developed by the US. Fish and Wildlife Service with the assistance of the Illinois Department of Conservation (1986) in the early 1980s, and an inventory by the Natural Resources Conservation Service (NRCS) that was being completed in McHenry County just as the ADID project began. While neither inventory was adequate alone (the NWI was becoming dated and the NRCS inventory, while more recent, and only a data set, focused principally on agricultural areas), in combination they served as a good starting point. In finalizing the inventory, numerous revisionsand improvements were made based on reviews of aerials photos, field checks, and the knowledge of local experts.

The resultant inventory identified 2,535 wetlands, including lakes, covering 37,846 acres. The inventory identified an additional 1,250 farmedwetlands covering 3,839 acres. In total, there were 3,785 wetlands in all categories covering 41,685 acres, or nearly 11% of the county.

Lakes were identified as a subset of wetlands. Specifically, lakes were distinguished based on a criterion of 20 acres or more of open water. Fifteen such lakes were identified (excluding gravel pits).

Type	Number	Acreage	Percent of County Area
Wetland	2,518	33,003	8.4
Farmed Wetland	1,250	3,839	1.0
Lake	15	3,584	0.9
River	2	1,259	0.3
Total	3,785	41,685	10.6

Streams were identified and mapped based on an inventory developed by the EPA. EPA's Stream Reach File, Version 3 (1:100,000 scale), with minor revisions, provided an accurate and complete inventory of county streams. The inventory included over 570 miles of streams ranging in size from small, unnamed headwaters to large rivers like the Fox and Kishwaukee.

Evaluation of the Functions and Quality of Aquatic Resources

As the first step in developing a wetland evaluation methodology, members of the policy committee were asked to identify wetland and aquatic resource functions that were important to McHenry County. After considerable discussion, the committee recommended that the following functions be considered and evaluated: biological/habitat functions, water quality mitigation functions, stormwater storage functions, and groundwater functions. These functions then were evaluated and refined by the technical committee. Ultimately, it was concluded that groundwater functions of wetlands, while having important water supply implications, could not be evaluated because of insufficient data.

The project team and advisors then proceeded to develop evaluation criteria and methodologies for the following general categories: *biological/habitat functions* and water *quality/stormwater* storage *functions.* The development of a methodology for identifying high-functional-quality wetlands in McHenry County relied both on existing wetland evaluation methodologies and the technical expertise of members of the technical advisory committee. The resultant methodology builds on a methodology used in nearby Lake County, Illinois (Dreher, et al., 1992) as well as other documented methodologies, particularly the Wetland Evaluation Technique (WET) manual (Adamus et al., 1987), the Oregon Method (Roth et al., 1993), and the Minnesota manual (U.S. Army Corps of Engineers, 1988).

The methodology was designed to accomplish two objectives: 1) identify the functions that individual wetlands were performing, and 2) identify wetlands of such high quality that they merit special consideration for protection strategies. The evaluation of the identified functions for individual wetlands can be very complex and some of the referenced methodologies describe fairly elaborate approaches to perform thorough evaluations. However, because of the large number of wetlands to be considered in McHenry County, it was necessary to adopt a simpler evaluation procedure. The resultant methodology isfullydocumented in the final project report, "Advanced Identification (ADID) Study, McHenry County, Illinois" (NIPC et al., 1998). An overview of the evaluation criteria follows.

Biological functions include wildlife habitat, floristic diversity, stream aquatic habitat, and lake aquatic habitat. Wetlands were considered *high quality* for this function if they met one of several criteria. These criteria included:

- the presence of threatened or endangered plant or animal species;
- designation in the Illinois or McHenry County Natural Areas Inventory (NAI);
- field evaluation as a grade A, B, or C wetland community following NAI methods;

. streams with Index of Biotic Integrity (IBI) scores of 41 or greater;

- streams with high quality physical habitat; and

. healthy lake ecosystems with rich/diverse fish and plant communities.

Wafer *quality/stormwater storage* functions include shoreline and streambank stabilization, sediment and toxicant retention, nutrient removal and transformation, and stormwater storage and hydrologic stabilization. In order to be designated *high functional* value for water quality/stormwater functions, wetlands were required to meet three of the four following criteria:

- presence of stabilizing vegetation adjacent to an open waterbody or perennial stream;
- surface area larger than five acres and having characteristics indicating the propensity for sediment/toxicant retention;
- surface area larger than five acres, upstream of a lake or impoundment, and having characteristics indicating the likelihood of nutrient removal/transformation; or
- surface area larger than five acres, at least 50% outside the floodplain, and having characteristics indicating significant stormwater retention.

Alternatively, wetlands could be designated *high functional value* for water quality functions if they provided individual water quality functions adjacent to or upstream of wetlands, lakes, or streams that provide high quality habitat.

Individual wetlands and waterbodies were evaluated using a three-step procedure of GIS screening; aerial photo, map or desk-top evaluation; and field evaluation (as needed). Based on this evaluation, it was determined that 154 wetlands totaling 17,489 acres, or about 42% of the county's entire wetland area, met the criteria for high-quality habitats. Most of the high-quality wetlands tended to be large parcels, averaging 114 acres in size in comparison to the average wetland size of 11 acres countywide. An additional 274 wetlands totaling 8,292 acres (average size of 30 acres) met the criteria for high value for stormwater and water quality functions. Thus, while a relatively small number of wetlands (about 11%) were designated high quality or high functional value, these wetlands represent over 60% of the total wetland acreage.

Classification	Number	Percent of all Wetlands	Acreage	Percent of County Area	Percent of all Wetland Area
High Quality Habitat	154	**4.0**	17,489	**4.5**	**42.0**
High Functional Value	**274**	**7.2**	8,292	2.1	19.9
High Quality Lake	**7**	**0.002**	1.346	**0.3**	**3.2**

Of the 15 inventoried lakes, seven were determined to be high quality. A total of 572 miles of stream were evaluated and 170 miles (or nearly 30%) were designated high quality. Interestingly, high-quality stream segments were found on 18 different named streams and rivers scattered throughout the county.

Using ADID for Protection and Restoration

The ultimate measure of success for a project like the McHenry County ADID study is how it contributes to the protection and restoration of aquatic resources. With this in mind, the project scope included a work element to develop

a strategy for protection and management of aquatic resources. With the assistance of the advisory committees, the project team developed a four-part strategy involving:

. improved education of local government officials, landowners, and the public;

. effective regulations and best management practices;

. expanded acquisition of aquatic sites and buffers; and

• restoration of degraded sites.

This strategy, which is described in detail in the project report (NIPC et al., 1998), is summarized below. Also described are some recent protection and management activities, although it is still too early to judge the long-term success of the project.

Improved Education: Educational initiatives are critical to improve awareness of wetlands and aquatic resources among local citizens, land owners, and elected officials. Improved awareness can enhance local support for protection, acquisition, and restoration programs.

. A 12-page brochure, *McHenry County's Wetlands, Lakes, and Streams,* was developed to educate the public and local officials about the value of wetlands and aquatic resources in their communities. The brochure also discussed the results of the ADID study and identified additional sources of information and agencies that can provide help. Over 1000 copies of brochure have been distributed by participating agencies, such as the county soil and water conservation district.

. Maps and information for all ADID sites were made available on a "user-friendly" CD-ROM. The CD-ROM includes simplified mapping software developed from a sophisticated GIS tool. The software enables querying and screening of various wetland characteristics at different geographic scales throughout the county. It also enables printing out detailed information on individual wetlands. Over 100 copies of the CD-ROM have been provided to local officials, consultants, and landowners in the county.

. The message of wetland, lake, and stream protection also is being carried to local officials and the public by county-based environmental groups and consortiums called "ecosystem partnerships" that have been established for the two main river watersheds in the county (the Fox and the Kishwaukee). ADID will be a useful tool in aiding the efforts of these organizations.

Effective Regulations: Effective regulations are needed to minimize the effects of new development on aquatic resources. Specifically, improved regulations are needed to fill in the gaps in existing federal, state, and local regulatory programs. It was the conclusion of both the ADID team and the *McHenry County Comprehensive Stormwater Managemenf Plan* (McHenry County, 1996) that improved regulations are needed to address concerns such as buffers and setbacks, depressional storage volumes, pretreatment of stormwater runoff, and effective environmental mitigation for unavoidable disturbances.

• Current federal regulations authorized under Section 404 of the Clean Water Act require a permit for the discharge of dredged or fill material into wetlands or other waters of the United States. Federal guidelines also authorize the EPA and the Corps of Engineers to identify in advance of specific permit requests, aquatic sites that will be considered as areas generally unsuitable for disposal of dredged or fill material. The Chicago District of the Corps has indicated that it will apply this discretionary authority to high-quality habitat and high- functional value sites in McHenry County. The Corps also generally will require an individual permit (which allows public input) for proposed modifications of ADID sites.

. Stream and wetland regulations, based on a model ordinance developed by NIPC, also have been adopted by a number of local governments in the county. These regulations are intended to complement the federal regulations by discouraging development in buffers and setbacks adjacent to wetlands, lakes, and streams and requiring pre-

treatment of stormwater discharges. The City of Woodstock, the county seat, recently applied its wetland protection regulations in a residential development review that resulted in an innovative conservation design around a large wetland. Not only will the wetland be avoided, but the site design calls for clustering of homes and buffers adjacent to wetland areas. Also, drainage swales and natural landscaping will be incorporated on upland portions of the site to reduce hydrologic and water quality impacts of the development.

- ADID team members have worked closely with staff and consultants to the McHenry County Stormwater Committee in the development of a countywide ordinance for new development. It has been recommended that the countywide ordinance include provisions for stream and wetland protection that complement, but do not duplicate, federal regulations. While the ordinance adoption process has been challenged by financial constraints and political changes in the county, it appears likely that significant stream and wetland protections will be added to existing county and municipal regulations.

Acquisition: Acquisition of important wetlands and stream corridors is one of the best ways to assure their long-term protection. In fact, recent experience indicates that these areas are becoming high priorities for public land acquisition. Information developed in the ADID study, particularly the identification of high-quality habitats and high-functional-quality wetlands, will be valuable to land acquisition agencies, including park districts, the McHenry County Conservation District, the Illinois Department of Natural Resources, and local land trusts, in assessing acquisition priorities. In a recent example, the Plan Commission of Nunda Township in east-central McHenry County is developing a comprehensive land use plan that will utilize ADID maps to identify areas to be preserved as open space.

Restoration: Restoration of degraded wetlands, lakes, and stream corridors, and ongoing management of higher quality sites, are critical challenges for land management agencies. Management is needed to counteract the effects of disturbances such as site fragmentation, elimination of fire, invasive species, and hydrologic alterations. Notably, the McHenry County Conservation District has been a regional leader in restoring degraded streams and wetlands. The ADID data base will be very useful in identifying appropriate sites to continue this restoration. The availability of GIS data bases and mapping, particularly in conjunction with other digital data such as soils maps and data on seeps and springs, will greatly facilitate this objective.

Lessons Learned

ADID was a valuable experience in McHenry County that generally met its identified objectives. In considering ADID studies in other areas, there are several important lessons one can learn from the McHenry County experience.

1) *Engage localgovernment sponsors and keep them informed throughout the project.* The McHenry County ADID began after the county board passed a resolution soliciting EPA's assistance. County staff and elected officials were invited to participate on advisory committees. When support appeared to waver at critical points in the process (e.g., staff changes and budget difficulties at the county), the project team reached out by convening special meetings reminding county officials of the benefits of the project with respect to adopted county objectives.

2) *Conduct an open* study *process involving both traditional supporters of stream and weflandprofecfion efforts and potential adversaries.* Groups ranging from environmental organizations to developers and the agricultural community were invited to participate on advisory committees where issues and approaches were openly discussed. When a public meeting was held to present project results, over 200 individuals attended. The vast majority of those expressing opinions indicated support for ADID objectives and procedures, even though some had concerns over the ramifications of federal wetland regulations.

3) *Utilize fhe expertise and local know/edge of federal, state, and local resource agencies.* While EPA contracted with NIPC to coordinate the project, staff from numerous resource agencies contributed invaluable expertise in hydrology, soils, aquatic ecology, and botany. They also contributed countless hours in evaluating field sites. Scheduling such assistance from multiple agencies resulted in some time delays. However, without these voluntary contributions, the project could not have been completed.

4) *Define wet/and and aquatic resource functions from a multi-objective perspective.* While there is a tendency sometimes to focus on just the habitat and recreational values of wetlands, lakes, and streams, it is important to consider a broader range of benefits to maximize local buy-in to the process. The McHenry County ADID specifically considered stormwater and water quality functions that were identified as being important in local plans, such as the *McHenry County Comprehensive Stormwater Management Plan.*

5) *Distribute end-products in user-friend/y formats.* While ADID was a highly technical and complex project, efforts were made to provide products that were readily understandable by local governments, land owners, consultants, and the public. The product receiving the most interest was the CD-ROM containing ADID data, as well as a user-friendly GIS-based interface for querying and mapping. The CD-ROM promises to be much more useful than conventional paper maps.

6) *Engage the local press in covering the project.* Limited attempts were made to inform the local press during the course of the study. While there was some resultant news coverage in local newspapers, particularly around the time of the public meeting, this coverage was not particularly effective in informing the public about the benefits of wetlands and the importance of the ADID study. Focused efforts, such as targeted press releases, probably would have improved the frequency and quality of coverage.

Conclusions

The ADID study provides valuable information to advance the protection and restoration of wetlands and aquatic resources in McHenry County. It can aid residents and organizations desiring to protect high-quality resources or restore sites that have been degraded. It can inform landowners and developers about an appropriate course of action when they are considering disturbances in or adjacent to high-quality sites.

While the final ADID products have been available for only a short time, it is apparent that they will greatly facilitate ongoing efforts to educate county residents and officials, protect streams and wetlands from the effects of new development, preserve sensitive stream corridors and wetlands as public land, and restore degraded sites. While the ultimate success of county stream and wetland protection initiatives will depend on the will of landowners and local government officials, no one will be able to blame wetland loss on inadequate information.

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